

**CJ** **COOK-JOYCE INC.**  
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21 September 2006

Mr. Fred Duffy  
Underground Injection Control Section  
Industrial and Hazardous Waste Division  
Texas Commission on Environmental Quality  
P.O. Box 13087  
Austin, Texas 78711

VIA HAND DELIVERY

Re: Corsicana Technologies, Inc.  
UIC Permit No. WDW-394  
RN 100756287; CN 600442883

RECEIVED

SEP 22 2006  
WASTE DIVISION  
TEXAS COMMISSION ON  
ENVIRONMENTAL QUALITY  
DA

Dear Fred:

Enclosed please find one original and three copies, two of which are to be submitted to the U.S. Environmental Protection Agency, of the Aquifer Exemption Request prepared pursuant to Corsicana Technologies, Inc.'s request for exempt status of the Woodbine Aquifer.

If you have any questions or need any further information, please call Doug Granger at 512/474-9097.

Sincerely,



Doug Granger, P.G.

DG:nn

Enclosure

cc: Tom Kowalski - CTI  
Orlando Cardoso - CTI  
Kathy McGee - CJI

DUE DATE 11/21/2006  
WWC# 12015160-2  
PM F Duffy  
TEAM ☐ 1 ☐ 2 ☒ UIC

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**Corsicana Technologies Response to TCEQ Notices of Deficiency Dated  
August 10, 2006**

1. In Section 4.0 *Reservoir Modeling*, states that the requested aquifer exemption is the permitted injection zone of the lower Woodbine interval from 2,869 to 3,000 feet below Kelly bushing (KB). The exact depth of the Woodbine sands were unknown when WDW394 permit was issued and only became known when the Woodbine section was logged after drilling. The top of the injection zone, 2,869 feet puts it into the "B" sand. The "intent" of the permit application and the issued permit was to restrict the injection zone and injection interval to only the "A" sand (2955-3000 feet in WDW394). Please make the necessary changes to read; injection zone is 2920-3000 feet and the injection interval is 2955-3000 feet.

**Corsicana Response to NOD No. 1**

The requested changes have been made in Section 4.0 Reservoir Modeling (revised). Minor changes and additions were also made to Sections 5.0 and 6.0 of the Aquifer Exemption Request document. The revised document has been submitted with this NOD response.

2. Section 4.2.6 *Initial Reservoir Pressure and Pressure Gradient* states, "The initial reservoir pressure during the drilling of WDW394 was not measured directly..." This is not correct. Reservoir pressure readings were taken in the four (4) individual Woodbine sands at 2590, 2730, 2880 and 2982 feet KB. These measurements were taken by the wireline logging tool, Selective Formation Tester (SFT). Please use the value recorded at 2982 feet (in the "A" sand) for revised reservoir modeling.

**Corsicana Response to NOD No. 2**

The Selective Formation Tester (SFT) logs referenced above were reviewed. The following pressures were measured by Precision Energy Services on the dates given in the table below. The sand designations refer to individual Woodbine sands that were previously mapped across the AOR. The proposed exempt aquifer is comprised of the A sand at a log depth of 2955 feet to 3000 feet below Kelly Bushing (BKB). The B, C, and D sands are stratigraphically higher than the A sand.

Date	Log Depth (feet BKB*)	Sand	Pressure (psig)
5/30/2005	2982	A	1132
5/15/2005	2880	B	918
5/14/2005	2730	C	1026
5/14/2005	2590	D	965

\*KB elevation is 401 feet ASL and the ground level elevation is 387 feet ASL.



The variation in pressure with depth is not linear. For example, the pressure in the C sand is higher than that in the underlying B sand. This is an indication that there is hydraulic isolation between the Woodbine sand layers. This means that the shale overlying the proposed exempt aquifer provides a hydraulic barrier that will prevent upward migration of injected fluids.

The bottomhole pressure for the A sand was used in a revised SWIFT model. Also, the text of Section 4, Reservoir modeling has been updated. The revised model results and updated text are attached.

3. Section 4.3.2 *Description of the SWIFT Model for the Proposed Exempt Aquifer* states, "The model assumes homogeneous and isotropic, porous media flow conditions. A constant thickness and dip were imposed on the entire model area." Review of updip electric logs from WDW394 suggests the "A" sand is thinning, not constant thickness. Should the model be adjusted and treated as a wedge, instead of a homogeneous, isotropic "slab"?

#### **Corsicana Response to NOD No. 3**

Due to the distance involved, the suggested modeling of the A sand as a wedge would have a negligible impact on the plume geometry. It is correct that the A sand thins to the west of the WDW-394 location. However, even 4.75 miles away at the Navarro College geothermal well location (ID no. 5, on new Figure 6.2 of the Aquifer Exemption request), the A sand is still well defined with approximately 44 feet of net sand. The open hole log for this well is shown on page 146 of Appendix B. The A sand consists of two lobes present between the log depths of 2542 to 2610 feet BKB. By comparison, the A sand net thickness at WDW-394, used in the SWIFT model, is approximately 36 feet. This net sand value was chosen as an average thickness for the AOR.

As shown in revised Figures 4-1 to 4-4 (attached) the calculated plume radius is approximately 4000 feet. Therefore, the impact on the model of the thickness change will be negligible as it is well beyond the 2.5 mile Area of Review (AOR) radius. The model thickness, therefore, has not been changed.

4. Also in section 4.3.2, "...all of the modeled historical injection from WDW-117 was assumed to be into the lower Woodbine." WDW117 injected waste both into the "A" and "B" sand. In all probability, the "B" sand received the majority of the waste. In the present model, all of the waste injected by WDW117 was assigned to the "A" sand. Please revise the modeling to reflect true historical injection activities of WDW117.

#### **Corsicana Response to NOD No. 4**

The assumption that all of the waste from WDW-117 was injected into the A sand was designed to be conservative. It is correct that most of the waste injected into WDW-117 was into the B sand. The modeling has been revised as suggested.

WDW-117 was perforated over 76 feet of the Upper Woodbine B sand as follows:





2790 feet – 2828 feet BKB = 38 feet  
2832 feet – 2844 feet BKB = 12 feet  
2926 feet – 2932 feet BKB = 6 feet  
2935 feet – 2955 feet BKB = 20 feet

In WDW-117 the ground level elevation is 390 feet above sea level (ASL) and the KB elevation is 397 feet ASL. The relationship between the two wells is given below. In WDW-394 the ground level elevation is 387 feet above sea level (ASL) and the KB elevation is 401 feet ASL.

WDW-117 Perforations (feet BKB)	WDW-117 Perforations (feet subsea)	Thickness (feet)	Sand	WDW-394 Perforations (feet BKB)	WDW-394 Perforations (ft subsea)
2790-2828	2393-2431	38	B Upper Woodbine		
2832-2844	2435-2447	12	B Upper Woodbine		
2926-2932	2529-2535	6	A Lower Woodbine		
2935-2955	2538-2558	20	A Lower Woodbine		
		10	A Lower Woodbine	2959-2969	2558-2568
		19	A Lower Woodbine	2980-2999	2579-2598

In the absence of continuous flowmeter survey information, it was assumed that the flow of fluids in the Woodbine sands was evenly distributed in the perforated intervals. Since only 26 feet of the WDW-117 perforations were in the A sand, 26/76 feet = 0.342 or 34.2% of the flow could have entered the lower Woodbine A sand. Therefore 34.2% of the flow from WDW-117 was allocated in the revised SWIFT model. In addition, another run was performed that includes only the flow from WDW-394.

5. Please provide a new, updated copy of the aquifer exemption document which may be forwarded to Environmental Protection Agency Region 6.

#### Corsicana Response to NOD No. 5

The updated copy of the aquifer exemption document has been provided.

#### Attachments

Revised Aquifer Exemption Document